Electronic supplements: Influence of environmental and population factors on Prince William Sound spawning phenology.

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Table S1. Prince William Sound model performance based on Akaike information criterion corrected for small sample size (AICc). NLL = Log-Likelihood; *k* = Model parameters; AIC Wt. = Model Probability; AICc wt. = weighting from AIC for each model; ER = Evidence Ratio; D^2= Deviance explained.

#	Models	NLL	*k*	AICc	ΔAICc	AICc wt.	ER	D^2
2	~mean age + April SST + winter downwelling+ Fall meridional winds+ Summer PNA	-121.965	7	261.429	0	0.517	1	0.521
3	~mean age + April SST + winter downwelling+Summer PNA	-124.741	6	264.026	2.597	0.141	3.66	0.449
1	~SSB + mean age + April SST + winter downwelling+ Fall meridional winds+ Summer PNA	-121.694	8	264.032	2.603	0.140	3.67	0.527
4	~April SST + winter downwelling + Summer PNA	-126.47	5	264.704	3.275	0.100	5.14	0.4
10	~mean age + March SST + winter downwelling+ Fall meridional winds+ Summer PNA	-123.649	7	264.798	3.369	0.095	5.38	0.479
9	Summer PNA	-132.696	3	272.058	10.629	0.002	203.26	0.18
8	winter downwelling	-133.964	3	274.594	13.165	7e-04	722.26	0.127
5	~SSB	-133.966	3	274.598	13.169	7e-04	723.62	0.127
6	~mean age	-134.415	3	275.498	14.068	5e-04	1134.66	0.107
7	~April SST	-134.683	3	276.034	14.604	3e-04	1483.29	0.095

Table S2. Western Prince William Sound model performance based on Akaike information criterion corrected for small sample size (AICc). NLL = Log-Likelihood; k = Model parameters; AIC Wt. = Model Probability; AICc wt. = weighting from AIC for each model; ER = Evidence Ratio; D^2= Deviance explained.

#	Models	NLL	k	AICc	ΔAICc	AICc wt.	ER	D^2
20	~mean age + modeled freshwater input + Summer PNA	-92.629	5	197.757	0	0.74	1	0.375
15	~mean age + modeled freshwater input+ April SST	-94.705	5	201.909	4.152	0.0928	7.973	0.283
21	~mean age + modeled freshwater input + Summer MEI.v2	-95.108	5	202.716	4.959	0.062	11.935	0.263
22	~mean age	-98.234	3	203.391	5.634	0.0442	16.724	0.092
17	~mean age + Winter meridional winds + modeled freshwater input + April SST	-94.639	6	204.929	7.172	0.0205	36.095	0.286
16	~Mile-days of Milt + mean age + modeled freshwater input + April SST	-94.703	6	205.058	7.301	0.0192	38.496	0.283
19	~mean age + modeled freshwater input + April SST + winter downwelling + Fall meridional winds + Summer PNA	-91.385	8	205.627	7.87	0.0145	51.158	0.425
14	~SSB+ mean age + Winter meridional winds + modeled freshwater input + April SST	-94.621	7	208.333	10.576	0.0037	197.917	0.287
18	~mean age + Winter meridional winds + modeled freshwater input + April SST + winter downwelling + Fall meridional winds + Summer PNA	-90.901	9	208.801	11.044	0.003	250.134	0.443
12	~modeled freshwater input+ April SST	-120.798	4	250.887	53.13	0	-	0.153
23	~modeled freshwater input+Summer PNA	-120.939	4	251.169	53.412	0	-	0.146
13	~Mile-days of Milt + modeled freshwater input+ April SST	-120.554	5	253.108	55.351	0	-	0.164
5	~Spring offshore SST	-123.352	3	253.454	55.697	0	-	0.024

2	~Mile-days of Milt	-123.519	3	253.788	56.031	0	-	0.015
1	~SSB	-123.56	3	253.869	56.112	0	-	0.012
4	~Winter offshore SST	-123.635	3	254.021	56.264	0	-	0.008
8	~Summer NPGO	-123.702	3	254.153	56.396	0	-	0.004
3	~Fall offshore SST	-123.745	3	254.241	56.484	0	-	0.002
6	~winter downwelling	-123.778	3	254.306	56.549	0	-	0
7	~Winter NPGO	-123.779	3	254.308	56.551	0	-	0
11	~SSB + April SST + winter downwelling + Winter NPGO	-122.943	6	260.783	63.026	0	-	0.046
10	~SSB + April SST + winter downwelling+ Summer NPGO	-122.945	6	260.786	63.029	0	-	0.045
9	~SSB + April SST + Spring offshore SST + winter downwelling + Winter NPGO	-122.703	7	263.405	65.648	0	-	0.058

Table S3. Eastern Prince William Sound model performance based on Akaike information criterion corrected for small sample size (AICc). NLL = Log-Likelihood; *k* = Model parameters; AIC Wt. = Model Probability; AICc wt. = weighting from AIC for each model; ER = Evidence Ratio; D^2= Deviance explained.

#	Models	LL	K	AICc	ΔAICc	AICc wt.	ER	D^2
22	~mile-days of milt + Winter meridional winds + Winter downwelling + Summer PNA	-124.546	6	263.638	0	0.537	1	0.495
26	~mile-days of milt + mean age + Winter meridional winds + Winter downwelling	-126.236	6	267.017	3.379	0.0991	5.417	0.45
28	~mile-days of milt + Winter meridional winds + Winter downwelling + Winter PNA	-126.293	6	267.132	3.494	0.0936	5.738	0.449
23	~SSB + Winter meridional winds + Winter downwelling	-128.482	5	268.728	5.09	0.0421	12.745	0.385
24	~mean age + Winter meridional winds + Winter downwelling	-128.519	5	268.803	5.166	0.0406	13.234	0.384
29	~mile-days of milt + Fall meridional winds + Winter downwelling + Summer PNA	-127.139	6	268.824	5.186	0.0402	13.372	0.425
10	~ Winter meridional wind	-131.39	3	269.447	5.81	0.0294	18.263	0.288
27	~mile-days of milt + mean age+ April SST+ Winter meridional winds + Winter downwelling + Summer PNA	-124.43	8	269.504	5.867	0.0286	18.792	0.498
21	~SSB + Winter meridional winds + Winter zonal wind + Winter downwelling + Summer PNA	-126.185	7	269.87	6.232	0.0238	22.559	0.452
14	~SSB + Winter zonal wind	-130.603	4	270.348	6.711	0.0187	28.656	0.316
16	~SSB + Winter meridional wind	-130.788	4	270.72	7.082	0.0156	34.5	0.31
1	~SSB	-132.909	3	272.485	8.848	0.0064	83.42	0.232
19	~SSB + April SST + Winter zonal wind	-130.45	5	272.665	9.027	0.0059	91.253	0.321
17	~SSB + Fall meridional wind	-132.032	4	273.207	9.569	0.0045	119.643	0.265
2	~Mile-days of Milt	-133.352	3	273.371	9.733	0.0041	129.871	0.215
18	~SSB + Spring zonal wind	-132.249	4	273.642	10.004	0.0036	148.716	0.257
15	~SSB + April SST	-132.289	4	273.721	10.083	0.0035	154.731	0.256
11	~Fall meridional wind	-134.195	3	275.056	11.419	0.0018	301.699	0.181
7	~Winter downwelling	-135.706	3	278.079	14.442	4e-04	1367.72	0.117

3	~April SST	-135.961	3	278.59	14.952	3e-04	1765.06	0.106
25	~mean age + FWinput.total.t + April SST + Winter downwelling + Fall meridional winds + Summer PNA	-129.069	8	278.784	15.146	3e-04	1945.15	0.366
8	~Summer PNA	-136.514	3	279.694	16.056	2e-04	3065.95	0.081
13	~Spring zonal wind	-137.363	3	281.392	17.755	1e-04	7167.16	0.041
12	~Winter zonal wind	-137.553	3	281.773	18.136	1e-04	8672.48	0.032
4	~Fall offshore SST	-137.834	3	282.334	18.697	0	11479.3	0.018
5	~Winter offshore SST	-138.124	3	282.915	19.277	0	15345.4	0.004
6	~Spring offshore SST	-138.184	3	283.034	19.397	0	16290.9	0.001
9	~Summer NPGO	-138.191	3	283.048	19.41	0	16400.6	0
20	~modeled freshwater input	-138.197	3	283.061	19.424	0	16510.6	0

Table S4. Prince William Sound with region as a factor model performance based on Akaike information criterion corrected for small sample size (AICc). NLL = Log-Likelihood; *k* = Model parameters; AIC Wt. = Model Probability; AICc wt. = weighting from AIC for each model; ER = Evidence Ratio; D^2= Deviance explained.

#	Models	LL	*k*	AICc	ΔAICc	AICc wt.	ER	D^2
4	~region + mile-days of milt *region* + *mean age*Region + Winter meridional winds + Winter downwelling + modeled freshwater input + Summer PNA	-217.137	11	460.826	0	0.4956	1	0.57
15	~region + mile-days of milt *region* + *mean age*region+ Winter meridional winds+ March SST + Winter downwelling + modeled freshwater input + Summer PNA	-216.722	12	462.917	2.091	0.1742	2.84	0.575
14	~region + mile-days of milt *region* + *mean age*region+ Winter meridional winds+ April SST + Winter downwelling + modeled freshwater input + Summer PNA	-217.072	12	463.617	2.791	0.1227	4.03	0.571
3	~mile-days of milt*Region* + *mean age*region + Winter meridional winds + Winter downwelling + modeled freshwater input*Region+ Summer PNA	-217.116	12	463.705	2.879	0.1175	4.21	0.57
13	~region + mile-days of milt *region* + *mean age*region+ Winter meridional winds+ April SST + March SST + Winter downwelling + modeled freshwater input + Summer PNA	-216.704	13	465.908	5.082	0.0391	12.69	0.576
18	~region+ Surplus production 10-year regime shift + mile-days of milt * Surplus production 10-year	-214.11	15	467.108	6.282	0.0214	23.13	0.606

	regime shift + mean age* Surplus production 10-year regime shift + Winter meridional winds + Winter downwelling + modeled freshwater input + Summer PNA							
5	~region + mile-days of milt*region*SSB 10-year regime shift +mean age*region + Winter meridional winds + Winter downwelling + modeled freshwater input + Summer PNA	-214.406	15	467.701	6.874	0.0159	31.10	0.602
12	~region + mile-days of milt *region + Winter meridional winds + Winter downwelling + modeled freshwater input + Summer PNA	-222.539	10	468.807	7.981	0.0092	54.08	0.498
11	~region + mile-days of milt *region + mean age* SSB 10-year regime shift + Winter meridional winds + Winter downwelling + modeled freshwater input + Summer PNA	-220.771	12	471.017	10.191	0.003	163.24	0.523
9	~modeled freshwater input* SSB 10-year regime shift	-231.705	5	474.348	13.522	6e-04	863.48	0.348
17	~region+ SSB 5-year regime shift + mile-days of milt *SSB 5-year regime shift + mean age* SSB 5-year regime shift + Winter meridional winds + Winter downwelling + modeled freshwater input + Summer PNA	-211.086	19	475.373	14.547	3e-04	1441.41	0.638
19	~region+ Surplus production 5-year regime shift + mile-days of milt * Surplus production 5-year regime shift + mean age* Surplus production 5-year regime shift +	-211.086	19	475.373	14.547	3e-04	1441.40	0.638

	Winter meridional winds + Winter downwelling + modeled freshwater input + Summer PNA							
6	~region+ SSB 10-year regime shift + mile-days of milt *SSB 10-year regime shift + mean age* SSB 10-year regime shift + Winter meridional winds + Winter downwelling + modeled freshwater input + Summer PNA	-226.013	12	481.5	20.673	0	30845.14	0.446
7	~SSB 10-year regime shift + mean age* SSB 10-year regime shift + Winter meridional winds + Winter downwelling + modeled freshwater input + Summer PNA	-230.822	9	482.645	21.818	0	-	0.365
8	~modeled freshwater input	-239.073	4	486.762	25.936	0	-	0.196
2	~mean age + modeled freshwater input + Summer PNA	-238.875	5	488.688	27.862	0	-	0.2
1	~mile-days of milt + Winter meridional wind + Winter downwelling + Summer PNA	-237.714	6	488.761	27.935	0	-	0.226
10	~mean age*SSB 10-year regime shift	-240.774	5	492.485	31.659	0	-	0.156
16	~null model	-246.694	2	497.567	36.741	0	-	0

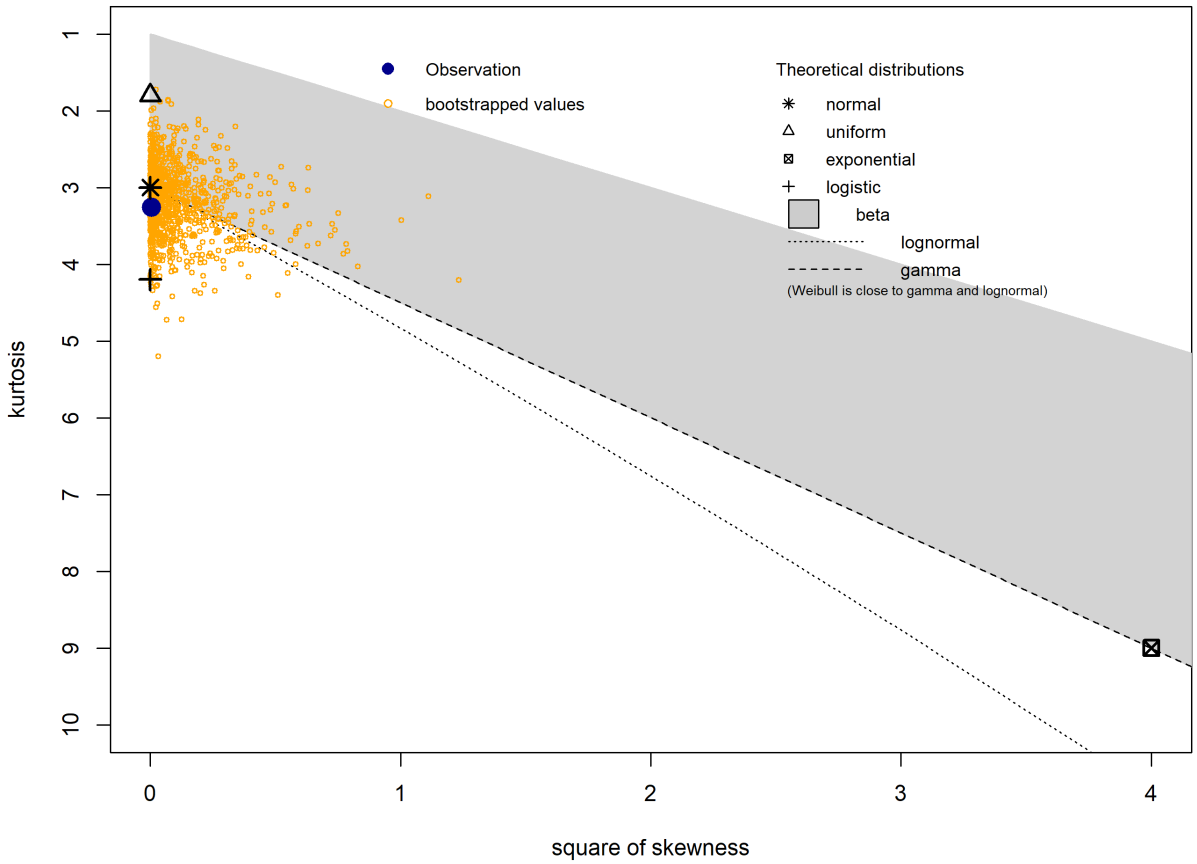

Figure S1: Cullen and Frey graph for the median spawning date. The plot shows the proximity of the data to the normal distribution, justifying the model choice.

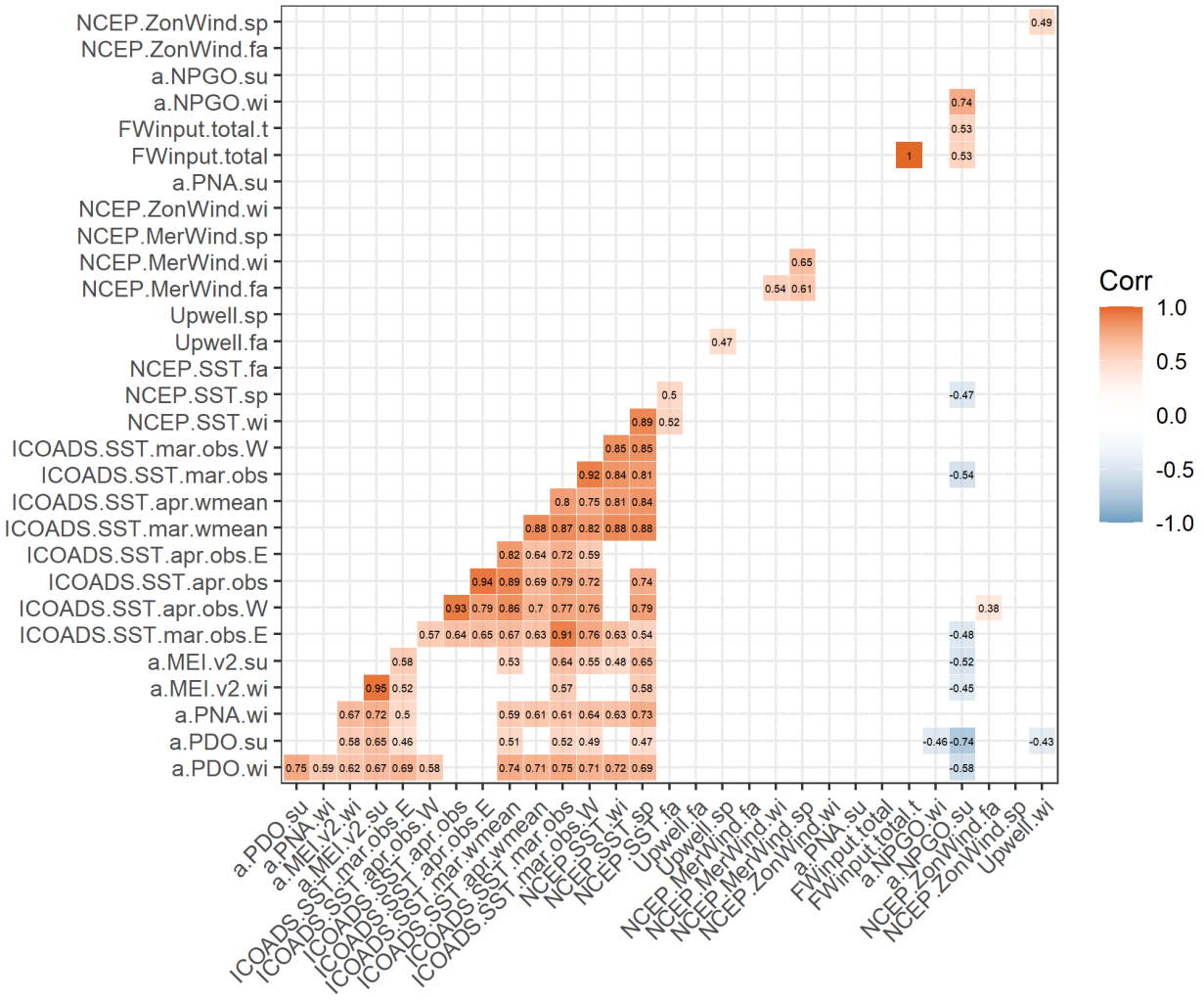

Figure S2: Environmental and climatological variables correlation plot for all variables, including Western and Eastern sound specific variables.

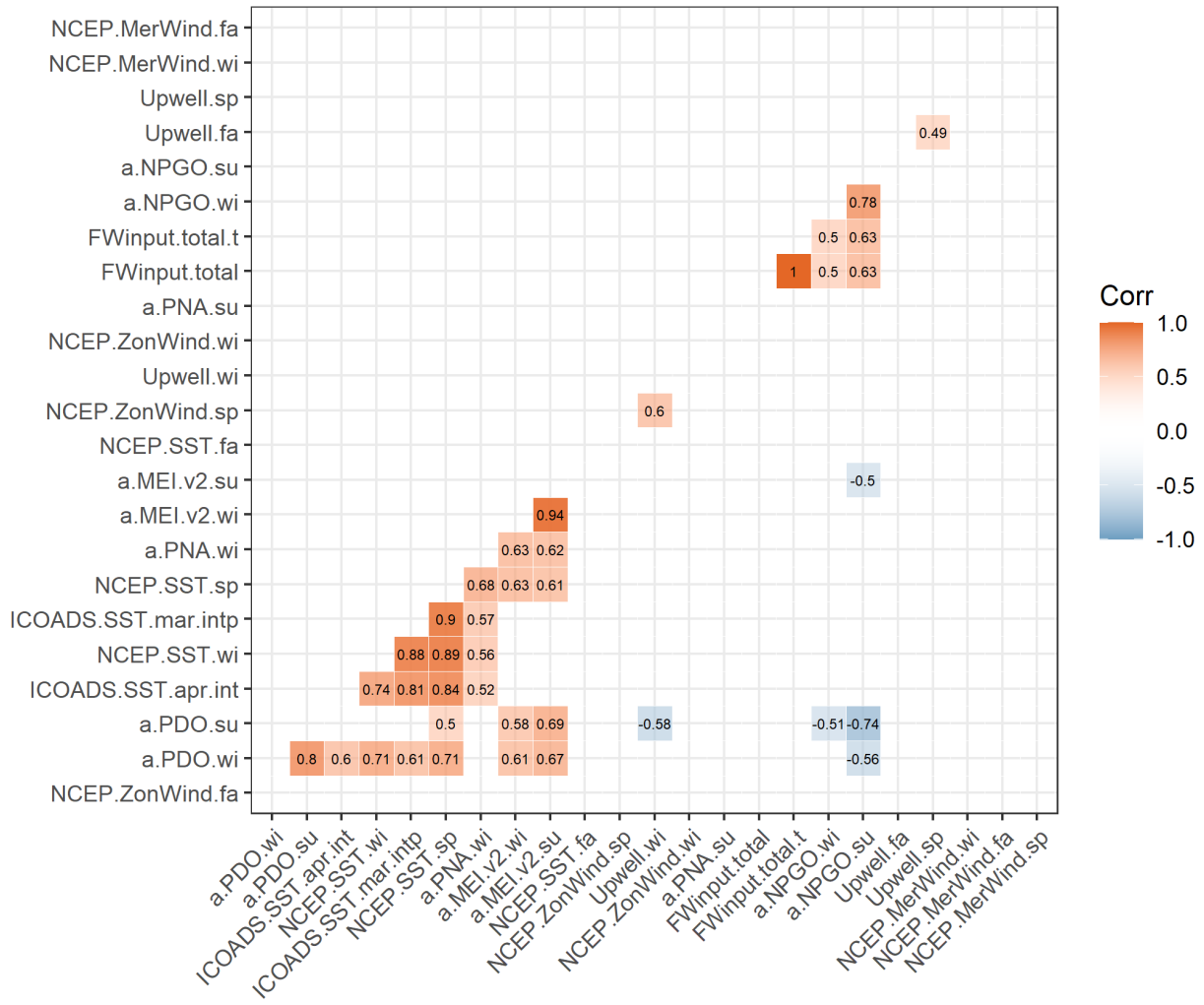

Figure S3: Environmental and climatological variables correlation plot region specific for western sound.

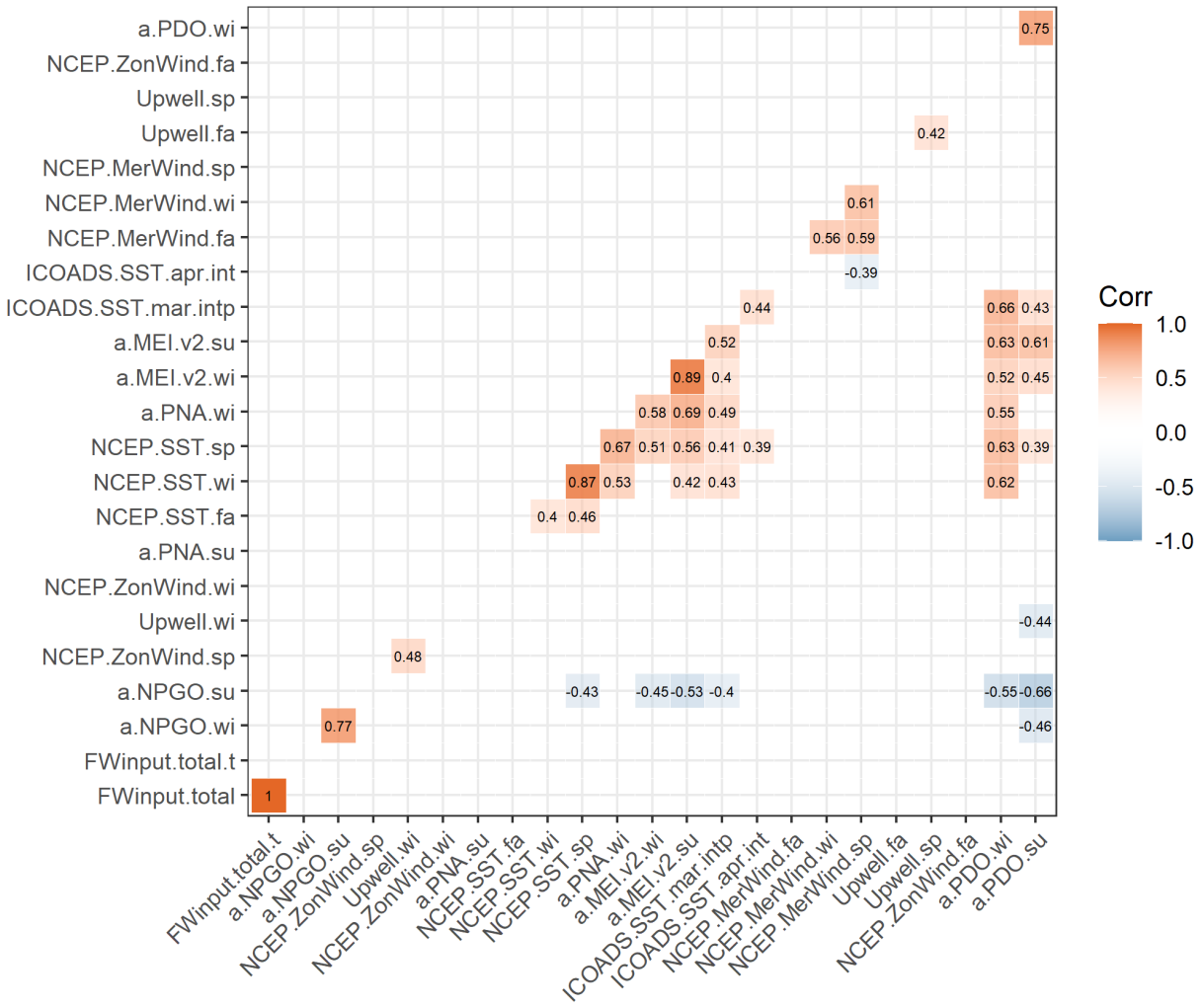

Figure S3: Environmental and climatological variables correlation plot region specific for eastern sound.